

## **AMENDMENTS TO THE CLAIMS**

Please amend Claims 20, 21, 41, 43, 45, 68, 69, 71, 73, 79, 81, 83, 113-115, 117, 119 and 121 as follows.

### **LISTING OF CLAIMS**

1. (original) A piezoelectric ceramic composition of a general formula  $\{Li_x(K_{1-y}Na_y)_{1-x}\}(NB_{1-z-w}Ta_zSb_w)O_3$  where x, y, z, and w are in the ranges of  $0 \leq x \leq 0.2$ ,  $0 \leq y \leq 1$ ,  $0 < z \leq 0.4$ , and  $0 < w \leq 0.2$ .
2. (original) A piezoelectric ceramic composition as set forth in claim 1, wherein the range of said x in said general formula is  $0 < x \leq 0.2$ .
3. (original) A piezoelectric ceramic composition as set forth in claim 1, wherein the value of said x in said general formula is  $x=0$ .
4. (original) A piezoelectric ceramic composition as set forth in claim 1, wherein the range of said y in said general formula is  $0 < y \leq 1$ .
5. (original) A piezoelectric ceramic composition as set forth in claim 1, wherein the value of said y in said general formula is  $y=0$ .
6. (original) A piezoelectric ceramic composition as set forth in claim 1, wherein said piezoelectric ceramic composition has a piezoelectric  $d_{31}$  constant of not less than 30 pm/V.

7. (original) A piezoelectric ceramic composition as set forth in claim 1, wherein said piezoelectric ceramic composition has a piezoelectric  $g_{31}$  constant of not less than  $7 \times 10^{-3}$  Vm/N.

8. (original) A piezoelectric ceramic composition as set forth in claim 1, wherein said piezoelectric ceramic composition has an electromechanical coupling coefficient  $K_p$  of not less than 0.3.

9. (original) A piezoelectric ceramic composition as set forth in claim 1, wherein said piezoelectric ceramic composition has a dielectric loss of not more than 0.09.

10. (original) A piezoelectric ceramic composition as set forth in claim 1, wherein said piezoelectric ceramic composition has a relative dielectric constant of not less than 400.

11. (original) A piezoelectric ceramic composition as set forth in claim 1, wherein said piezoelectric ceramic composition has a Curie temperature  $T_c$  of not less than  $200^\circ\text{C}$ .

12. (original) A piezoelectric ceramic composition as set forth in claim 1, wherein said piezoelectric ceramic composition has a piezoelectric  $d_{31}$  constant of not less than 30 pm/V and a Curie temperature  $T_c$  of not less than 200 °C.

13. (original) A piezoelectric ceramic composition as set forth in claim 1, wherein said piezoelectric ceramic composition has a piezoelectric  $g_{31}$  constant of not less than  $7 \times 10^{-3}$  Vm/N and a Curie temperature  $T_c$  of not less than 200 °C.

14. (original) A piezoelectric ceramic composition as set forth in claim 1, wherein said piezoelectric ceramic composition has an electromechanical coupling coefficient  $K_p$  of not less than 0.3 and a Curie temperature  $T_c$  of not less than 200 °C.

15. (original) A piezoelectric ceramic composition as set forth in claim 1, wherein said piezoelectric ceramic composition has a dielectric loss of not more than 0.09 and a Curie temperature  $T_c$  of not less than 200 °C.

16. (original) A piezoelectric ceramic composition as set forth in claim 1, wherein said piezoelectric ceramic composition has a piezoelectric  $d_{31}$  constant of not less than 30 pm/V, an electromechanical coupling coefficient  $K_p$  of not less than 0.3, and a Curie temperature  $T_c$  of not less than 200 °C.

17. (original) A method of production of a piezoelectric ceramic composition comprising shaping and sintering a powder comprised of a piezoelectric ceramic

composition of a general formula  $\{Li_x(K_{1-y}Na_y)_{1-x}\}(Nb_{1-z-w}Ta_zSb_w)O_3$  where x, y, z, and w are in the ranges of  $0 \leq x \leq 0.2$ ,  $0 \leq y \leq 1$ ,  $0 < z \leq 0.4$ , and  $0 < w \leq 0.2$ .

18. (original) A method of production of a piezoelectric ceramic composition comprising mixing and sintering a compound containing lithium, a compound containing sodium, a compound containing potassium, a compound containing niobium, a compound containing tantalum, and a compound containing antimony so as to obtain a piezoelectric ceramic composition as set forth in claim 1.

19. (original) A method of production of a piezoelectric ceramic composition as set forth in claim 18, wherein said compound containing lithium is  $Li_2CO_3$ , said compound containing sodium is  $Na_2CO_3$ , said compound containing potassium is  $K_2CO_3$ , said compound containing niobium is  $Nb_2O_5$ , said compound containing tantalum is  $Ta_2O_5$ , and said compound containing antimony is  $Sb_2O_5$  or  $Sb_2O_3$ .

20. (currently amended) A piezoelectric element having a piezoelectric body comprised of a piezoelectric ceramic composition produced by a method of production of claim [[1]] 17.

21. (currently amended) A dielectric element having a dielectric body comprised of a piezoelectric ceramic composition produced by a method of production of claim [[1]] 17.

22. (original) A piezoelectric ceramic composition having a compound of a general formula  $\{Li_x(K_{1-y}Na_y)_{1-x}\}(Nb_{1-z-w}Ta_zSb_w)O_3$  where x, y, z, and w are in the ranges of  $0 \leq x \leq 0.2$ ,  $0 \leq y \leq 1$ ,  $0 < z \leq 0.4$ , and  $0 < w \leq 0.2$  as a main ingredient, wherein

said piezoelectric ceramic composition contains at least one metal element selected from palladium, silver, gold, ruthenium, rhodium, rhenium, osmium, iridium, and platinum as an added element, and

a total of the contents of said added elements is 0.001 mol to 0.15 mol with respect to 1 mole of the compound of the above general formula.

23. (original) A piezoelectric ceramic composition as set forth in claim 22, wherein a piezoelectric  $d_{31}$  constant of said piezoelectric ceramic composition is larger than a piezoelectric  $d_{31}$  constant of a piezoelectric ceramic composition of the above general formula not containing said added elements.

24. (original) A piezoelectric ceramic composition as set forth in claim 22, wherein an electromechanical coupling coefficient  $K_p$  of said piezoelectric ceramic composition is larger than an electromechanical coupling coefficient  $K_p$  of a piezoelectric ceramic composition of the above general formula not containing said added elements.

25. (original) A piezoelectric ceramic composition as set forth in claim 22, wherein a piezoelectric  $g_{31}$  constant of said piezoelectric ceramic composition is larger

than a piezoelectric  $g_{31}$  constant of a piezoelectric ceramic composition of the above general formula not containing said added elements.

26. (original) A piezoelectric ceramic composition as set forth in claim 22, wherein a relative dielectric constant of said piezoelectric ceramic composition is larger than a relative dielectric constant of a piezoelectric ceramic composition of the above general formula not containing said added elements.

27. (original) A piezoelectric ceramic composition as set forth in claim 22, wherein a dielectric loss of said piezoelectric ceramic composition is smaller than a dielectric loss of a piezoelectric ceramic composition of the above general formula not containing said added elements.

28. (original) A piezoelectric ceramic composition as set forth in claim 22, wherein a Curie temperature  $T_c$  of said piezoelectric ceramic composition is larger than a Curie temperature of a piezoelectric ceramic composition of the above general formula not containing said added elements.

29. (original) A piezoelectric ceramic composition as set forth in claim 22, wherein said piezoelectric ceramic composition has a piezoelectric  $d_{31}$  constant of not less than 30 pm/V.

30. (original) A piezoelectric ceramic composition as set forth in claim 22, wherein said piezoelectric ceramic composition has an electromechanical coupling coefficient  $K_p$  of not less than 0.3.

31. (original) A piezoelectric ceramic composition as set forth in claim 22, wherein said piezoelectric ceramic composition has a piezoelectric  $g_{31}$  constant of not less than  $7 \times 10^{-3}$  Vm/N.

32. (original) A piezoelectric ceramic composition as set forth in claim 22, wherein said piezoelectric ceramic composition has a relative dielectric constant of not less than 400.

33. (original) A piezoelectric ceramic composition as set forth in claim 22, wherein said piezoelectric ceramic composition has a dielectric loss of not more than 0.09.

34. (original) A piezoelectric ceramic composition as set forth in claim 22, wherein said piezoelectric ceramic composition has a Curie temperature  $T_c$  of not less than 200 °C.

35. (original) A piezoelectric ceramic composition as set forth in claim 22, wherein said piezoelectric ceramic composition has a piezoelectric  $d_{31}$  constant of not less than 30 pm/V and a Curie temperature  $T_c$  of not less than 200 °C.

36. (original) A piezoelectric ceramic composition as set forth in claim 22, wherein said piezoelectric ceramic composition has a piezoelectric  $g_{31}$  constant of not less than  $7 \times 10^{-3}$  Vm/N and a Curie temperature  $T_c$  of not less than  $200^\circ\text{C}$ .

37. (original) A piezoelectric ceramic composition as set forth in claim 22, wherein said piezoelectric ceramic composition has an electromechanical coupling coefficient  $K_p$  of not less than 0.3 and a Curie temperature  $T_c$  of not less than  $200^\circ\text{C}$ .

38. (original) A piezoelectric ceramic composition as set forth in claim 22, wherein said piezoelectric ceramic composition has a dielectric loss of not more than 0.09 and a Curie temperature  $T_c$  of not less than  $200^\circ\text{C}$ .

39. (original) A piezoelectric ceramic composition as set forth in claim 22, wherein said piezoelectric ceramic composition has a piezoelectric  $d_{31}$  constant of not less than 30 pm/V, an electromechanical coupling coefficient  $K_p$  of not less than 0.3, and a Curie temperature  $T_c$  of not less than  $200^\circ\text{C}$ .

40. (original) A method of production of a piezoelectric ceramic composition comprising mixing and sintering a compound of a general formula  $\{\text{Li}_x(\text{K}_{1-y}\text{Na}_y)_{1-x}\}(\text{Nb}_{1-z-w}\text{Ta}_z\text{Sb}_w)\text{O}_3$  where  $x$ ,  $y$ ,  $z$ , and  $w$  are in the ranges of  $0 \leq x \leq 0.2$ ,  $0 \leq y \leq 1$ ,  $0 < z \leq 0.4$ , and  $0 < w \leq 0.2$  and an additive including at least one metal element selected from palladium, silver, gold, ruthenium, rhodium, rhenium, osmium, iridium, and platinum.



41. (currently amended) A method of production of a piezoelectric ceramic composition comprising mixing a compound containing lithium, a compound containing sodium, a compound containing potassium, a compound containing niobium, a compound containing tantalum, and a compound containing antimony either by a stoichiometric ratio giving, after sintering, a compound of a general formula  $\{Li_x(K_{1-y}Na_y)_{1-x}\}(Nb_{1-z-w}Ta_zSb_w)O_3$  where x, y, z, and w are in the ranges of  $0 \leq x \leq 0.2$ ,  $0 \leq y \leq 1$ ,  $0 < z \leq 0.4$ , and  $0 < w \leq 0.2$  or by a stoichiometric ratio considering substitution to either Li, K, Na, Nb, Ta, or Sb in a general formula  $\{Li_x(K_{1-y}Na_y)_{1-x}\}(Nb_{1-z-w}Ta_zSb_w)O_3$  where x, y, z, and w are in the ranges of  $0 \leq x \leq 0.2$ ,  $0 \leq y \leq 1$ ,  $0 < z \leq 0.4$ ,  $0 < w \leq 0.2$  by a metal element contained in the following additive, mixing an additive containing at least one metal element selected from palladium, silver, gold ruthenium, rhodium, rhenium, osmium, iridium, and platinum, and sintering the result.

42. (original) A method of production of a piezoelectric ceramic composition as set forth in claim 41, wherein said compound containing lithium is  $Li_2CO_3$ , said compound containing sodium is  $Na_2CO_3$ , said compound containing potassium is  $K_2CO_3$ , said compound containing niobium is  $Nb_2O_5$ , said compound containing tantalum is  $Ta_2O_5$ , and said compound containing antimony is  $Sb_2O_5$  or  $Sb_2O_3$  and said additive is at least one additive selected from  $PdO_2$ ,  $Ag_2O$ , Au,  $Au_2O$ ,  $Ru_2O$ ,  $RhO$ ,  $Re_2O_5$ ,  $OsO_2$ ,  $IrO_2$ , and  $PtO_2$ .

43. (currently amended) A piezoelectric element having a piezoelectric body comprised of a piezoelectric ceramic composition produced by a method of production of claim ~~[[22]]~~ 41.

44. (original) A piezoelectric element having a piezoelectric body comprised of a piezoelectric ceramic composition produced by a method of production of claim 40.

45. (currently amended) A dielectric element having a dielectric body comprised of a piezoelectric ceramic composition produced by a method of production of claim ~~[[22]]~~ 41.

46. (original) A dielectric element having a dielectric body comprised of a piezoelectric ceramic composition produced by a method of production of claim 40.

47. (original) A piezoelectric ceramic composition having a compound of a general formula  $\{Li_x(K_{1-y}Na_y)_{1-x}\}(Nb_{1-z-w}Ta_zSb_w)O_3$  where x, y, z, and w are in the ranges of  $0 \leq x \leq 0.2$ ,  $0 \leq y \leq 1$ ,  $0 < z \leq 0.4$ , and  $0 < w \leq 0.2$  as a main ingredient, wherein

said piezoelectric ceramic composition contains at least one metal element selected from nickel, iron, manganese, copper, and zinc as an added element, and

a total of the contents of said added elements is 0.001 mol to 0.08 mol with respect to 1 mole of the compound of the above general formula.

48. (original) A piezoelectric ceramic composition as set forth in claim 47, wherein a piezoelectric  $d_{31}$  constant of said piezoelectric ceramic composition is larger than a piezoelectric  $d_{31}$  constant of a piezoelectric ceramic composition of the above general formula not containing said added elements.

49. (original) A piezoelectric ceramic composition as set forth in claim 47, wherein an electromechanical coupling coefficient  $K_p$  of said piezoelectric ceramic composition is larger than an electromechanical coupling coefficient  $K_p$  of a piezoelectric ceramic composition of the above general formula not containing said added elements.

50. (original) A piezoelectric ceramic composition as set forth in claim 47, wherein a piezoelectric  $g_{31}$  constant of said piezoelectric ceramic composition is larger than a piezoelectric  $g_{31}$  constant of a piezoelectric ceramic composition of the above general formula not containing said added elements.

51. (original) A piezoelectric ceramic composition as set forth in claim 47, wherein a mechanical quality factor  $Q_m$  of said piezoelectric ceramic composition is larger than a mechanical quality factor  $Q_m$  of a piezoelectric ceramic composition of the above general formula not containing said added elements.

52. (original) A piezoelectric ceramic composition as set forth in claim 47, wherein a relative dielectric constant of said piezoelectric ceramic composition is larger

than a relative dielectric constant of a piezoelectric ceramic composition of the above general formula not containing said added elements.

53. (original) A piezoelectric ceramic composition as set forth in claim 47, wherein a dielectric loss of said piezoelectric ceramic composition is smaller than a dielectric loss of a piezoelectric ceramic composition of the above general formula not containing said added elements.

54. (original) A piezoelectric ceramic composition as set forth in claim 47, wherein a Curie temperature  $T_c$  of said piezoelectric ceramic composition is larger than a Curie temperature of a piezoelectric ceramic composition of the above general formula not containing said added elements.

55. (original) A piezoelectric ceramic composition as set forth in claim 47, wherein said piezoelectric ceramic composition has a piezoelectric  $d_{31}$  constant of not less than 30 pm/V.

56. (original) A piezoelectric ceramic composition as set forth in claim 47, wherein said piezoelectric ceramic composition has an electromechanical coupling coefficient  $K_p$  of not less than 0.3.

57. (original) A piezoelectric ceramic composition as set forth in claim 47, wherein said piezoelectric ceramic composition has a piezoelectric  $g_{31}$  constant of not less than  $7 \times 10^{-3}$  Vm/N.

58. (original) A piezoelectric ceramic composition as set forth in claim 47, wherein said piezoelectric ceramic composition has a mechanical quality factor  $Q_m$  of not less than 50.

59. (original) A piezoelectric ceramic composition as set forth in claim 47, wherein said piezoelectric ceramic composition has a relative dielectric constant of not less than 400.

60. (original) A piezoelectric ceramic composition as set forth in claim 47, wherein said piezoelectric ceramic composition has a dielectric loss of not more than 0.09.

61. (original) A piezoelectric ceramic composition as set forth in claim 47, wherein said piezoelectric ceramic composition has a Curie temperature  $T_c$  of not less than  $200^\circ\text{C}$ .

62. (original) A piezoelectric ceramic composition as set forth in claim 47, wherein said piezoelectric ceramic composition has a piezoelectric  $d_{31}$  constant of not less than 30 pm/V and a Curie temperature  $T_c$  of not less than  $200^\circ\text{C}$ .

63. (original) A piezoelectric ceramic composition as set forth in claim 47, wherein said piezoelectric ceramic composition has a piezoelectric  $g_{31}$  constant of not less than  $7 \times 10^{-3}$  Vm/N and a Curie temperature  $T_c$  of not less than  $200^\circ\text{C}$ .

64. (original) A piezoelectric ceramic composition as set forth in claim 47, wherein said piezoelectric ceramic composition has an electromechanical coupling coefficient  $K_p$  of not less than 0.3 and a Curie temperature  $T_c$  of not less than  $200^\circ\text{C}$ .

65. (original) A piezoelectric ceramic composition as set forth in claim 47, wherein said piezoelectric ceramic composition has a mechanical quality factor  $Q_m$  of not less than 50 and a Curie temperature  $T_c$  of not less than  $200^\circ\text{C}$ .

66. (original) A piezoelectric ceramic composition as set forth in claim 47, wherein said piezoelectric ceramic composition has a dielectric loss of not more than 0.09 and a Curie temperature  $T_c$  of not less than  $200^\circ\text{C}$ .

67. (original) A piezoelectric ceramic composition as set forth in claim 47, wherein said piezoelectric ceramic composition has a piezoelectric  $d_{31}$  constant of not less than 30 pm/V, an electromechanical coupling coefficient  $K_p$  of not less than 0.3, and a Curie temperature  $T_c$  of not less than  $200^\circ\text{C}$ .

68. (currently amended) A method of production of a piezoelectric ceramic composition comprising mixing and sintering a compound of a general formula  $\{Li_x(K_{1-y}Na_y)_{1-x}\}(Nb_{1-z-w}Ta_zSb_w)O_3$  where x, y, z, and w are in the ranges of  $0 \leq x \leq 0.2$ ,  $0 \leq y \leq 1$ ,  $0 < z \leq 0.4$ , and  $0 < w \leq 0.2$  and an additive including at least one metal element selected from nickel, iron ~~magnesium~~ manganese, copper, and zinc.

69. (currently amended) A method of production of a piezoelectric ceramic composition comprising mixing a compound containing lithium, a compound containing sodium, a compound containing potassium, a compound containing niobium, a compound containing tantalum, and a compound containing antimony either by a stoichiometric ratio giving, after sintering, a compound of a general formula  $\{Li_x(K_{1-y}Na_y)_{1-x}\}(Nb_{1-z-w}Ta_zSb_w)O_3$  where x, y, z, and w are in the ranges of  $0 \leq x \leq 0.2$ ,  $0 \leq y \leq 1$ ,  $0 < z \leq 0.4$ , and  $0 < w \leq 0.2$  or by a stoichiometric ratio considering substitution to either Li, K, Na, Nb, Ta, or Sb in a general formula  $(Li_x(K_{1-y}Na_y)_{1-x})(Nb_{1-z-w}Ta_zSb_w)O_3$  where x, y, z, and w are in the ranges of  $0 \leq x \leq 0.2$ ,  $0 \leq y \leq 1$ ,  $0 < z \leq 0.4$ ,  $0 < w \leq 0.2$  by a metal element contained in the following additive, mixing an additive containing at least one metal element selected from nickel, iron, magnesium, copper, and zinc, and sintering the result.

70. (original) A method of production of a piezoelectric ceramic composition as set forth in claim 69, wherein said compound containing lithium is  $Li_2CO_3$ , said compound containing sodium is  $Na_2CO_3$ , said compound containing potassium is  $K_2CO_3$ , said compound containing niobium is  $Nb_2O_5$ , said compound containing

tantalum is  $\text{Ta}_2\text{O}_5$ , and said compound containing antimony is  $\text{Sb}_2\text{O}_5$  or  $\text{Sb}_2\text{O}_3$  and said additive is at least one additive selected from  $\text{NiO}$ ,  $\text{Fe}_2\text{O}_3$ ,  $\text{Mn}_2\text{O}_5$ ,  $\text{Cu}_2\text{O}$ ,  $\text{MnO}$ ,  $\text{CuO}$ , and  $\text{ZnO}$ .

71. (currently amended) A piezoelectric element having a piezoelectric body comprised of a piezoelectric ceramic composition produced by a method of production of claim ~~[[47]]~~ 69.

72. (original) A piezoelectric element having a piezoelectric body comprised of a piezoelectric ceramic composition produced by a method of production of claim 68.

73. (currently amended) A dielectric element having a dielectric body comprised of a piezoelectric ceramic composition produced by a method of production of claim ~~[[47]]~~ 69.

74. (original) A dielectric element having a dielectric body comprised of a piezoelectric ceramic composition produced by a method of production of claim 68.

75. (original) A piezoelectric ceramic composition having a compound of a general formula  $\{\text{Li}_x(\text{K}_{1-y}\text{Na}_y)_{1-x}\}(\text{Nb}_{1-z-w}\text{Ta}_z\text{Sb}_w)\text{O}_3$  where  $x$ ,  $y$ ,  $z$ , and  $w$  are in the ranges of  $0 \leq x \leq 0.2$ ,  $0 \leq y \leq 1$ ,  $0 < z \leq 0.4$ , and  $0 < w \leq 0.2$  as a main ingredient, wherein

said piezoelectric ceramic composition contains at least one metal element selected from silver, aluminum, gold, boron, barium, bismuth, calcium, cerium,



cobalt, cesium, copper, dysprosium, erbium, europium, iron, gallium, gadolinium, germanium, hafnium, holmium, indium, iridium, lanthanum, lutetium, magnesium, manganese, neodymium, nickel, palladium, praseodymium, platinum, rubidium, rhenium, ruthenium, scandium, silicon, samarium, tin, strontium, terbium, titanium, thulium, vanadium, yttrium, ytterbium, zinc, and zirconium,

a total of the contents of said added elements is 0.0005 mol to 0.15 mol with respect to 1 mole of the compound of the above general formula, and

an open porosity is not more than 0.4 vol%.

76. (original) A piezoelectric ceramic composition as set forth in claim 75, wherein an apparent density of said piezoelectric ceramic composition is larger than an apparent density of a piezoelectric ceramic composition of the above general formula not containing said added elements.

77. (original) A piezoelectric ceramic composition as set forth in claim 75, wherein a porosity or open porosity of said piezoelectric ceramic composition is smaller than a porosity or open porosity of a piezoelectric ceramic composition of the above general formula not containing said added elements.

78. (original) A method of production of a piezoelectric ceramic composition comprising mixing and sintering a compound of a general formula  $\{Li_x(K_{1-y}Na_y)_{1-x}\}(Nb_{1-z-w}Ta_zSb_w)O_3$  where x, y, z, and w are in the ranges of  $0 \leq x \leq 0.2$ ,  $0 \leq y \leq 1$ ,  $0 < z \leq 0.4$ , and  $0 < w \leq 0.2$  and an additive including at least one metal element selected from silver,

aluminum, gold, boron, barium, bismuth, calcium, cerium, cobalt, cesium, copper, dysprosium, erbium, europium, iron, gallium, gadolinium, germanium, hafnium, holmium, indium, iridium, lanthanum, lutetium, magnesium, manganese, neodymium, nickel, palladium, praseodymium, platinum, rubidium, rhenium, ruthenium, scandium, silicon, samarium, tin, strontium, terbium, titanium, thulium, vanadium, yttrium, ytterbium, zinc, and zirconium.

79. (currently amended) A method of production of a piezoelectric ceramic composition comprising mixing a compound containing lithium, a compound containing sodium, a compound containing potassium, a compound containing niobium, a compound containing tantalum, and a compound containing antimony either by a stoichiometric ratio giving, after sintering, a compound of a general formula  $\{Li_x(K_{1-y}Na_y)_{1-x}\}(Nb_{1-z-w}Ta_zSb_w)O_3$  where x, y, z, and w are in the ranges of  $0 \leq x \leq 0.2$ ,  $0 \leq y \leq 1$ ,  $0 < z \leq 0.4$ , and  $0 < w \leq 0.2$  or by a stoichiometric ratio considering substitution to either Li, K, Na, Nb, Ta, or Sb in a general formula  $\{Li_x(K_{1-y}Na_y)_{1-x}\}(Nb_{1-z-w}Ta_zSb_w)O_3$  where x, y, z, and w are in the ranges of  $0 \leq x \leq 0.2$ ,  $0 \leq y \leq 1$ ,  $0 < z \leq 0.4$ ,  $0 < w \leq 0.2$  by a metal element contained in the following additive, mixing an additive containing at least one metal element selected from silver, aluminum, gold, boron, barium, bismuth, calcium, cerium, cobalt, cesium, copper, dysprosium, erbium, europium, iron, gallium, gadolinium, germanium, hafnium, holmium, indium, iridium, lanthanum, lutetium, magnesium, manganese, neodymium, nickel, palladium, praseodymium, platinum, rubidium, rhenium, ruthenium, scandium, silicon, samarium, tin, strontium, terbium, titanium, thulium, vanadium, yttrium, ytterbium, zinc, and zirconium, and sintering the result.

80. (original) A method of production of a piezoelectric ceramic composition as set forth in claim 79, wherein said compound containing lithium is  $\text{Li}_2\text{CO}_3$ , said compound containing sodium is  $\text{Na}_2\text{CO}_3$ , said compound containing potassium is  $\text{K}_2\text{CO}_3$ , said compound containing niobium is  $\text{Nb}_2\text{O}_5$ , said compound containing tantalum is  $\text{Ta}_2\text{O}_5$ , and said compound containing antimony is  $\text{Sb}_2\text{O}_5$  or  $\text{Sb}_2\text{O}_3$  and said additive is at least one additive selected from  $\text{Ag}_2\text{O}$ ,  $\text{Al}_2\text{O}_3$ ,  $\text{Au}$ ,  $\text{Au}_2\text{O}_3$ ,  $\text{B}_2\text{O}_3$ ,  $\text{H}_3\text{BO}_3$ ,  $\text{BaO}$ ,  $\text{BaO}_2$ ,  $\text{BaCO}_3$ ,  $\text{Bi}_2\text{O}_3$ ,  $\text{CaO}$ ,  $\text{CaCO}_3$ ,  $\text{CeO}_2$ ,  $\text{Ce}_2(\text{CO}_3)_3$ ,  $\text{CoO}$ ,  $\text{Co}_3\text{O}_4$ ,  $\text{CoCO}_3$ ,  $\text{Cs}_2\text{CO}_3$ ,  $\text{CuO}$ ,  $\text{Cu}_2\text{O}$ ,  $\text{Dy}_2\text{O}_3$ ,  $\text{Er}_2\text{O}_3$ ,  $\text{Eu}_2\text{O}_3$ ,  $\text{Fe}_2\text{O}_3$ ,  $\text{Ga}_2\text{O}_3$ ,  $\text{Gd}_2\text{O}_3$ ,  $\text{GeO}_2$ ,  $\text{HfO}_2$ ,  $\text{Ho}_2\text{O}_3$ ,  $\text{In}_2\text{O}_3$ ,  $\text{IrO}_2$ ,  $\text{Ir}_2\text{O}_3$ ,  $\text{La}_2\text{O}_3$ ,  $\text{Lu}_2\text{O}_3$ ,  $\text{MgO}$ ,  $\text{MgC}_2\text{O}_4$ ,  $\text{MnO}$ ,  $\text{MnO}_2$ ,  $\text{Mn}_2\text{O}_3$ ,  $\text{Mn}_3\text{O}_4$ ,  $\text{Nd}_2\text{O}_3$ ,  $\text{Nd}_2\text{CO}_3$ ,  $\text{NiO}$ ,  $\text{NiCO}_3$ ,  $\text{PdO}$ ,  $\text{Pr}_2\text{O}_3$ ,  $\text{Pr}_6\text{O}_{11}$ ,  $\text{Pr}_2(\text{CO}_3)_3$ ,  $\text{PtO}_2$ ,  $\text{Rb}_2\text{O}$ ,  $\text{Rb}_2\text{CO}_3$ ,  $\text{Re}_2\text{O}_7$ ,  $\text{RuO}_2$ ,  $\text{Sc}_2\text{O}_3$ ,  $\text{SiO}_2$ ,  $\text{SiO}$ ,  $\text{SiC}$ ,  $\text{Sm}_2\text{O}_3$ ,  $\text{SnO}$ ,  $\text{SnO}_2$ ,  $\text{SrO}$ ,  $\text{SrCO}_3$ ,  $\text{Tb}_4\text{O}_7$ ,  $\text{TiO}$ ,  $\text{Ti}_2\text{O}_3$ ,  $\text{TiO}_2$ ,  $\text{Tm}_2\text{O}_3$ ,  $\text{V}_2\text{O}_3$ ,  $\text{V}_2\text{O}_4$ ,  $\text{V}_2\text{O}_5$ ,  $\text{Y}_2\text{O}_3$ ,  $\text{Y}_2(\text{CO}_3)_3$ ,  $\text{Yb}_2\text{O}_3$ ,  $\text{ZnO}$ , and  $\text{ZrO}_2$ .

81. (currently amended) A piezoelectric element having a piezoelectric body comprised of a piezoelectric ceramic composition produced by a method of production of claim [[75]] 79.

82. (original) A piezoelectric element having a piezoelectric body comprised of a piezoelectric ceramic composition produced by a method of production of claim 78.

83. (currently amended) A dielectric element having a dielectric body comprised of a piezoelectric ceramic composition produced by a method of production of claim [[75]] 79.

84. (original) A dielectric element having a dielectric body comprised of a piezoelectric ceramic composition produced by a method of production of claim 78.

85. (original) A piezoelectric ceramic composition having a compound of a general formula  $\{Li_x(K_{1-y}Na_y)_{1-x}\}(Nb_{1-z-w}Ta_zSb_w)O_3$  where x, y, z, and w are in the ranges of  $0 \leq x \leq 0.2$ ,  $0 \leq y \leq 1$ ,  $0 < z \leq 0.4$ , and  $0 < w \leq 0.2$  as a main ingredient, wherein

said piezoelectric ceramic composition contains at least one metal element selected from magnesium, calcium, strontium, and barium as an added element, and

a total of the contents of said added elements is 0.0001 mol to 0.10 mol with respect to 1 mole of the compound of the above general formula.

86. (original) A piezoelectric ceramic composition as set forth in claim 85, wherein said added elements are included substituting at least part of the lithium, potassium, and sodium of said compound of said general formula.

87. (original) A piezoelectric ceramic composition having a compound of a general formula  $\{Li_x(K_{1-y}Na_y)_{1-x}\}(Nb_{1-z-w}Ta_zSb_w)O_3$  where x, y, z, and w are in the ranges of  $0 \leq x \leq 0.2$ ,  $0 \leq y \leq 1$ ,  $0 < z \leq 0.4$ , and  $0 < w \leq 0.2$  as a main ingredient, wherein

said piezoelectric ceramic composition contains at least one metal element selected from silicon, indium, and scandium as an added element, and

a total of the contents of said added elements is not more than 0.08 mol with respect to 1 mole of the compound of the above general formula.

88. (original) A piezoelectric ceramic composition as set forth in claim 87, wherein a total of the contents of said added elements is 0.0001 mol to 0.08 mol with respect to 1 mole of the compound of the above general formula.

89. (original) A piezoelectric ceramic composition having a compound of a general formula  $\{Li_x(K_{1-y}Na_y)_{1-x}\}(Nb_{1-z-w}Ta_zSb_w)O_3$  where x, y, z, and w are in the ranges of  $0 \leq x \leq 0.2$ ,  $0 \leq y \leq 1$ ,  $0 < z \leq 0.4$ , and  $0 < w \leq 0.2$  as a main ingredient, wherein

said piezoelectric ceramic composition contains bismuth as an added element, and

a content of said added element is 0.0001 mol to 0.004 mol with respect to 1 mole of the compound of the above general formula.

90. (original) A piezoelectric ceramic composition as set forth in claim 85, wherein a piezoelectric  $d_{31}$  constant of said piezoelectric ceramic composition is larger than a piezoelectric  $d_{31}$  constant of a piezoelectric ceramic composition of the above general formula not containing said added elements.

91. (original) A piezoelectric ceramic composition as set forth in claim 85, wherein an electromechanical coupling coefficient  $K_p$  of said piezoelectric ceramic composition is larger than an electromechanical coupling coefficient  $K_p$  of a piezoelectric ceramic composition of the above general formula not containing said added elements.

92. (original) A piezoelectric ceramic composition as set forth in claim 85, wherein a piezoelectric  $g_{31}$  constant of said piezoelectric ceramic composition is larger than a piezoelectric  $g_{31}$  constant of a piezoelectric ceramic composition of the above general formula not containing said added elements.

93. (original) A piezoelectric ceramic composition as set forth in claim 85, wherein a mechanical quality factor  $Q_m$  of said piezoelectric ceramic composition is larger than a mechanical quality factor  $Q_m$  of a piezoelectric ceramic composition of the above general formula not containing said added elements.

94. (original) A piezoelectric ceramic composition as set forth in claim 85, wherein a relative dielectric constant of said piezoelectric ceramic composition is larger than a relative dielectric constant of a piezoelectric ceramic composition of the above general formula not containing said added elements.

95. (original) A piezoelectric ceramic composition set forth in claim 85, wherein a dielectric loss of said piezoelectric ceramic composition is smaller than a

dielectric loss of a piezoelectric ceramic composition of the above general formula not containing said added elements.

96. (original) A piezoelectric ceramic composition as set forth in claim 85, wherein a Curie temperature  $T_c$  of said piezoelectric ceramic composition is larger than a Curie temperature of a piezoelectric ceramic composition of the above general formula not containing said added elements.

97. (original) A piezoelectric ceramic composition as set forth in claim 85, wherein said piezoelectric ceramic composition has a piezoelectric  $d_{31}$  constant of not less than 30 pm/V.

98. (original) A piezoelectric ceramic composition as set forth in claim 85, wherein said piezoelectric ceramic composition has an electromechanical coupling coefficient  $K_p$  of not less than 0.3.

99. (original) A piezoelectric ceramic composition as set forth in claim 85, wherein said piezoelectric ceramic composition has a piezoelectric  $g_{31}$  constant of not less than  $7 \times 10^{-3}$  Vm/N.

100. (original) A piezoelectric ceramic composition as set forth in claim 85, wherein said piezoelectric ceramic composition has a mechanical quality factor  $Q_m$  of not less than 50.

101. (original) A piezoelectric ceramic composition as set forth in claim 85, wherein said piezoelectric ceramic composition has a relative dielectric constant of not less than 400.

102. (original) A piezoelectric ceramic composition as set forth in claim 85, wherein said piezoelectric ceramic composition has a dielectric loss of not more than 0.09.

103. (original) A piezoelectric ceramic composition as set forth in claim 85, wherein said piezoelectric ceramic composition has a Curie temperature  $T_c$  of not less than 200 °C.

104. (original) A piezoelectric ceramic composition as set forth in claim 85, wherein said piezoelectric ceramic composition has a piezoelectric  $d_{31}$  constant of not less than 30 pm/V and a Curie temperature  $T_c$  of not less than 200 °C.

105. (original) A piezoelectric ceramic composition as set forth in claim 85, wherein said piezoelectric ceramic composition has a piezoelectric  $g_{31}$  constant of not less than  $7 \times 10^{-3}$  Vm/N and a Curie temperature  $T_c$  of not less than 200 °C.



106. (original) A piezoelectric ceramic composition as set forth in claim 85, wherein said piezoelectric ceramic composition has an electromechanical coupling coefficient  $K_p$  of not less than 0.3 and a Curie temperature  $T_c$  of not less than 200 °C.

107. (original) A piezoelectric ceramic composition as set forth in claim 85, wherein said piezoelectric ceramic composition has a mechanical quality factor  $Q_m$  of not less than 50 and a Curie temperature  $T_c$  of not less than 200 °C.

108. (original) A piezoelectric ceramic composition as set forth in claim 85, wherein said piezoelectric ceramic composition has a dielectric loss of not more than 0.09 and a Curie temperature  $T_c$  of not less than 200 °C.

109. (original) A piezoelectric ceramic composition as set forth in claim 85, wherein said piezoelectric ceramic composition has a piezoelectric  $d_{31}$  constant of not less than 30 pm/V, an electromechanical coupling coefficient  $K_p$  of not less than 0.3, and a Curie temperature  $T_c$  of not less than 200 °C.

110. (original) A method of production of a piezoelectric ceramic composition comprising mixing and sintering a compound of a general formula  $\{Li_x(K_{1-y}Na_y)_{1-x}\}(Nb_{1-z-w}Ta_zSb_w)O_3$  where  $x$ ,  $y$ ,  $z$ , and  $w$  are in the ranges of  $0 \leq x \leq 0.2$ ,  $0 \leq y \leq 1$ ,  $0 < z \leq 0.4$ , and  $0 < w \leq 0.2$  and an additive including at least one metal element selected from magnesium, calcium, strontium, and barium.

111. (original) A method of production of a piezoelectric ceramic composition comprising mixing and sintering a compound of a general formula  $\{Li_x(K_{1-y}Na_y)_{1-x}\}(Nb_{1-z-w}Ta_zSb_w)O_3$  where x, y, z, and w are in the ranges of  $0 \leq x \leq 0.2$ ,  $0 \leq y \leq 1$ ,  $0 < z \leq 0.4$ , and  $0 < w \leq 0.2$  and an additive including at least one metal element selected from silicon, indium, and scandium.

112. (original) A method of production of a piezoelectric ceramic composition comprising mixing and sintering a compound of a general formula  $\{Li_x(K_{1-y}Na_y)_{1-x}\}(Nb_{1-z-w}Ta_zSb_w)O_3$  where x, y, z, and w are in the ranges of  $0 \leq x \leq 0.2$ ,  $0 \leq y \leq 1$ ,  $0 < z \leq 0.4$ , and  $0 < w \leq 0.2$  and an additive included bismuth.

113. (currently amended) A method of production of piezoelectric ceramic composition comprising preparing a compound containing lithium, a compound containing sodium, a compound containing potassium, a compound containing niobium, a compound containing tantalum, and a compound containing antimony either by a stoichiometric ratio giving, after sintering, a compound of a general formula  $\{Li_x(K_{1-y}Na_y)_{1-x}\}(Nb_{1-z-w}Ta_zSb_w)O_3$  where x, y, z, and w are in the ranges of  $0 \leq x \leq 0.2$ ,  $0 \leq y \leq 1$ ,  $0 < z \leq 0.4$ , and  $0 < w \leq 0.2$  or by a stoichiometric ratio considering substitution to either Li, K, Na, Nb, Ta, or Sb in a general formula  $\{Li_x(K_{1-y}Na_y)_{1-x}\}(Nb_{1-z-w}Ta_zSb_w)O_3$  where x, y, z, and w are in the ranges of  $0 \leq x \leq 0.2$ ,  $0 \leq y \leq 1$ ,  $0 < z \leq 0.4$ , and  $0 < w \leq 0.2$  by a metal element contained in the following additive, mixing an additive containing at least one metal element selected from magnesium, calcium, strontium, and barium, and sintering the result.

114. (currently amended) A method of production of a piezoelectric ceramic composition as set forth in claim 113, wherein said compound containing lithium is  $\text{Li}_2\text{CO}_3$ , said compound containing sodium is  $\text{Na}_2\text{CO}_3$ , said compound containing potassium is  $\text{K}_2\text{CO}_3$ , said compound containing niobium is  $\text{Nb}_2\text{O}_5$ , said compound containing tantalum is  $\text{Ta}_2\text{O}_5$ , and said compound containing antimony is  $\text{Sb}_2\text{O}_5$  or  $\text{Sb}_2\text{O}_3$  and said additive is at least one additive selected from  $\text{MgO}$ ,  $[[\text{MgC3}]]$   $\text{MgCO}_3$ ,  $\text{CaO}$ ,  $\text{CaCO}_3$ ,  $\text{SrO}$ ,  $\text{SrCO}_3$ ,  $\text{BaO}$ , and  $\text{BaCO}_3$ .

115. (currently amended) A method of production of piezoelectric ceramic composition comprising preparing a compound containing lithium, a compound containing sodium, a compound containing potassium, a compound containing niobium, a compound containing tantalum, and a compound containing antimony either by a stoichiometric ratio giving, after sintering, a compound of a general formula  $\{\text{Li}_x(\text{K}_{1-y}\text{Na}_y)_{1-x}\}(\text{Nb}_{1-z-w}\text{Ta}_z\text{Sb}_w)\text{O}_3$  where  $x$ ,  $y$ ,  $z$ , and  $w$  are in the ranges of  $0 \leq x \leq 0.2$ ,  $0 \leq y \leq 1$ ,  $0 < z \leq 0.4$ , and  $0 < w \leq 0.2$  or by a stoichiometric ratio considering substitution to either Li, K, Na, Nb, Ta, or Sb in a general formula  $\{\text{Li}_x(\text{K}_{1-y}\text{Na}_y)_{1-x}\}(\text{Nb}_{1-z-w}\text{Ta}_z\text{Sb}_w)\text{O}_3$  where  $x$ ,  $y$ ,  $z$ , and  $w$  are in the ranges of  $0 \leq x \leq 0.2$ ,  $0 \leq y \leq 1$ ,  $0 < z \leq 0.4$ , and  $0 < w \leq 0.2$  by a metal element contained in the following additive, mixing an additive containing at least one metal element selected from ~~strontium~~ silicon, indium, and scandium, and sintering the result.

116. (original) A method of production of a piezoelectric ceramic composition as set forth in claim 115, wherein said compound containing lithium is  $\text{Li}_2\text{CO}_3$ , said compound containing sodium is  $\text{Na}_2\text{CO}_3$ , said compound containing potassium is  $\text{K}_2\text{CO}_3$ , said compound containing niobium is  $\text{Nb}_2\text{O}_5$ , said compound containing tantalum is  $\text{Ta}_2\text{O}_5$ , and said compound containing antimony is  $\text{Sb}_2\text{O}_5$  or  $\text{Sb}_2\text{O}_3$  and said additive is at least one additive selected from  $\text{SiO}_2$ ,  $\text{In}_2\text{O}_3$ , and  $\text{Sc}_2\text{O}_3$ .

117. (currently amended) A method of production of a piezoelectric ceramic composition comprising preparing a compound containing lithium, a compound containing sodium, a compound containing potassium, a compound containing niobium, a compound containing tantalum, and a compound containing antimony either by a stoichiometric ratio giving, after sintering, a compound of a general formula  $\{\text{Li}_x(\text{K}_{1-y}\text{Na}_y)_{1-x}\}(\text{Nb}_{1-z-w}\text{Ta}_z\text{Sb}_w)\text{O}_3$  where x, y, z, and w are in the ranges of  $0 \leq x \leq 0.2$ ,  $0 \leq y \leq 1$ ,  $0 < z \leq 0.4$ , and  $0 < w \leq 0.2$  or by a stoichiometric ratio considering substitution to either Li, K, Na, Nb, Ta, or Sb in a general formula  $\{\text{Li}_x(\text{K}_{1-y}\text{Na}_y)_{1-x}\}(\text{Nb}_{1-z-w}\text{Ta}_z\text{Sb}_w)\text{O}_3$  where x, y, z, and w are in the ranges of  $0 \leq x \leq 0.2$ ,  $0 \leq y \leq 1$ ,  $0 < z \leq 0.4$ , and  $0 < w \leq 0.2$  by bismuth atoms a metal element contained in the following additive, mixing an additive containing bismuth, and sintering the result.

118. (original) A method of production of a piezoelectric ceramic composition as set forth in claim 117, wherein said compound containing lithium is  $\text{Li}_2\text{CO}_3$ , said compound containing sodium is  $\text{Na}_2\text{CO}_3$ , said compound containing potassium is  $\text{K}_2\text{CO}_3$ , said compound containing niobium is  $\text{Nb}_2\text{O}_5$ , said compound containing

tantalum is  $\text{Ta}_2\text{O}_5$ , and said compound containing antimony is  $\text{Sb}_2\text{O}_5$  or  $\text{Sb}_2\text{O}_3$  and said additive is  $\text{Bi}_2\text{O}_3$ .

119. (currently amended) A piezoelectric element having a piezoelectric body comprised of a piezoelectric ceramic composition produced by a method of production of claim ~~[[85]]~~ 111.

120. (original) A piezoelectric element having a piezoelectric body comprised of a piezoelectric ceramic composition produced by a method of production of claim 110.

121. (currently amended) A dielectric element having a dielectric body comprised of a piezoelectric ceramic composition produced by a method of production of claim ~~[[85]]~~ 111.

122. (original) A dielectric element having a dielectric body comprised of a piezoelectric ceramic composition produced by a method of production of claim 110.